Goldfish Treatment near Zortman, MT

Draft Environmental Assessment

6/1/2020

Montana Fish, Wildlife & Parks
Region 6 Office
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Havre, MT 59501

Montana Fish, Wildlife & Parks

Executive Summary

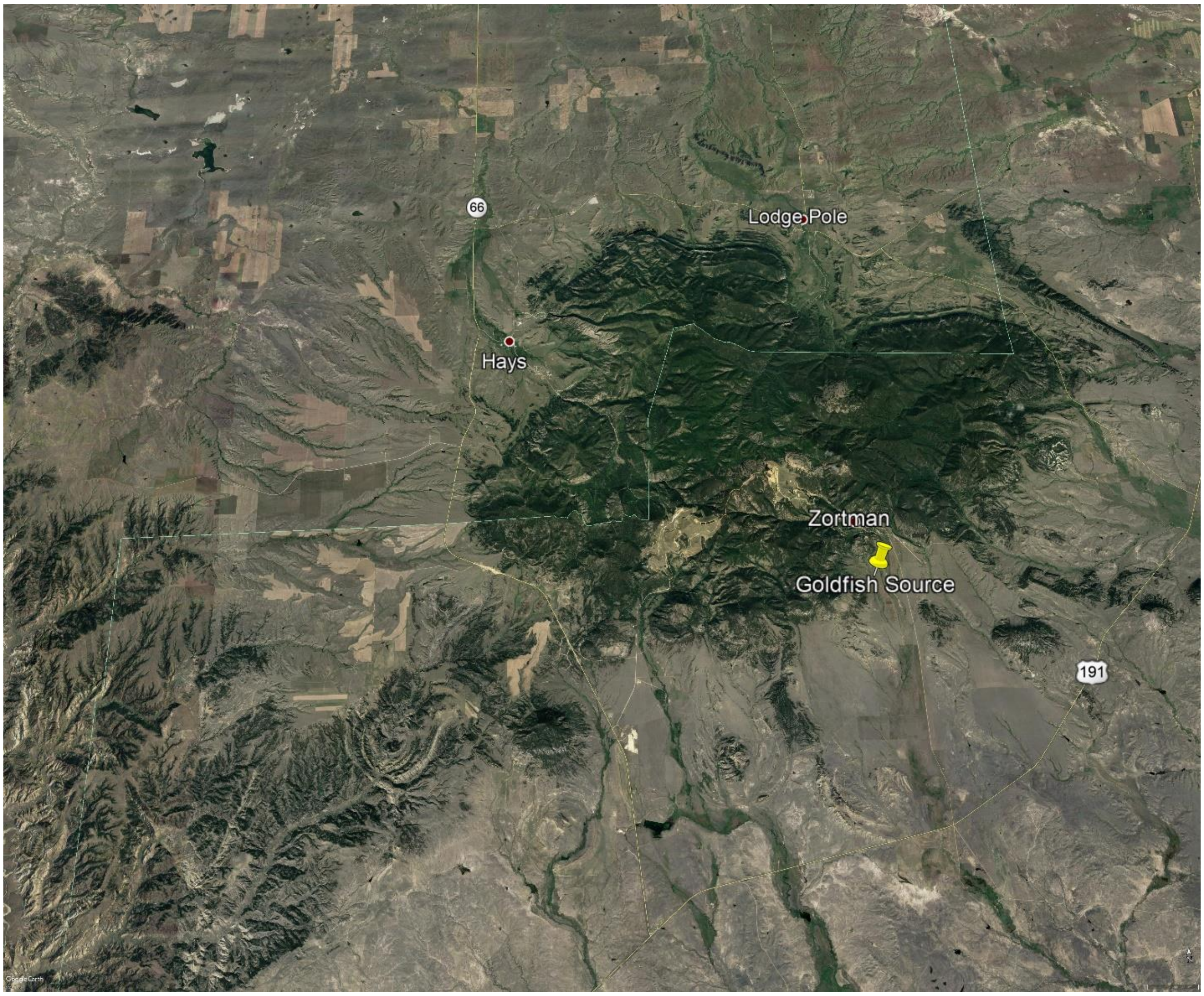

Figure 1. Location of goldfish population and nearby cities.

The conservation and inherent value of native and non-native game fish is substantial. Unfortunately, an unmanaged source population of goldfish, an aquatic invasive species, threatens the distribution and densities of downstream populations of several native prairie fish species. Moreover, the threat of this goldfish population to continue to reproduce and redistribute to downstream locations needs to be addressed immediately to eliminate the risk of competition with native fish and expansion of this non-native invasive species in the Fort Peck drainage.

All species of fish in the Fort Peck Drainage face the threat of goldfish expansion to downstream locations if this source population continues to exist.

In 2016, MFWP attempted a non-chemical removal of goldfish at the site, which failed. Goldfish expansion to downstream locations, and potentially into Fort Peck Reservoir, is the greatest threat if no treatment is done.

EAs are a requirement of the Montana Environmental Policy Act (MEPA), which require state agencies to consider the environmental, social, cultural, and economic effects of proposed actions. This EA considers potential consequences of 3 alternatives to eradicate goldfish in Upper CK Creek. The no action alternative would allow the current goldfish population to continue to grow and possibly expand downstream, this alternative is not preferred. Mechanical suppression was attempted in November 2016 by pumping the reservoir down to minimal pool elevations and removing all goldfish with nets. This effort failed to remove all goldfish due to inefficiencies with removal gear and difficulties keeping pool elevations drawn down for an extended period. The 3 alternatives considered are:

1. Alternative 1: No Action
2. Alternative 2: (Preferred): Chemical treatment (rotenone).
3. Alternative 3: Mechanical suppression- Attempted in 2016 and failed.

Alternative 2 is the preferred alternative. It would have short-term, minor effects on wildlife, recreation, and vegetation. This alternative would be highly efficient at removing all goldfish and would be a substantial contribution to the long-term conservation of downstream fish species.

MEPA require public involvement and opportunity for the public to comment on projects undertaken by the acts' respective agencies. A public comment period will extend from 6/16/2020 to 7/17/2020. Interested parties should send comments to:

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List of Abbreviations

ARM	Administrative Rules of Montana
CGNF	Custer Gallatin National Forest
DEGEE	diethyl glycol monoethyl ether
DEQ	Montana Department of Environmental Quality
EA	Environmental Assessment
EPT	Ephemeroptera, Plecoptera, Trichoptera (mayflies, stone flies, & caddis flies)
FS	Forest Service
FWP	Montana Fish, Wildlife & Parks
GMU	Geographic management unit
$KMnO_4$	potassium permanganate
MCA	Montana Code Annotated
MCTSC	Montana Cutthroat Trout Steering Committee
MEPA	Montana Environmental Policy Act
MNHP	Montana Natural Heritage Program
NEPA	National Environmental Policy Act
SNF	Shoshone National Forest
WFGD	Wyoming Fish and Game Department
YNP	Yellowstone National Park
MOU	Memorandum of understanding
MRDG	Minimum Requirements Decision Guide
MSDS	Material data safety data sheet
NPS	National Park Service
USEPA	United States Environmental Protection Agency

2 PROPOSED ACTION and BACKGROUND

2.1 *Type of Proposed Action*

Remove goldfish population using the piscicide rotenone to eliminate distribution to downstream locations.

2.2 *Agency Authority for the Proposed Action*

Montana state law provides FWP with the authority for implementation of fish management and restoration projects (MCA § 87-1-702; § 87-1-201[9][a]). In addition, Montana state law authorizes FWP to manage wildlife, fish, game and nongame animals to prevent the need for listing under the Endangered Species Act or ESA, and listed, sensitive, or species that are candidates for listing under the ESA must be managed in manner that assists in the maintenance or recovery of the species (MCA§ 87-5-107). In waters where FWP is seeking to remove or control unauthorized species, FWP must endeavor to protect the previously existing fishery and suppress or eradicate the unauthorized species to maintain the existing management objectives for that fishery (ARM 12. 7. 1501[4]). Montana state law also allows the use of chemicals to remove fish (ARM 12. 7. 1503[1][f][ii]).

Planning documents and strategies developed by agencies and collaborating entities also provide official justification for the proposed project (Table 1). These include conservation agreements among stakeholder groups, state and federal laws, and agency plans designed to conserve secure and protect fish within Upper CK Creek.

Table 1. Planning and strategy documents with relevance to Goldfish Treatment near Zortman, MT.

Citation	*Website*
Memorandum of Understanding and Conservation Strategy for Montana (2013)	http://fwp. mt. http://fwp. mt.
Statewide Fisheries Management Plan (2014)	http://fwp.mt.gov/fishAndWildlife/management/fisheries/statewidePlan/
Wild Fish Transfer Policy (1996)	http://fwp.mt.gov/fishAndWildlife/management/westslopeCT/default. html
Piscicide Policy (2017)	Internal document
Endangered Species Act	http://www. fws. gov/endangered/Endangered Species Act-library/pdf/Endangered Species Actall. pdf

2.3 *Estimated Commencement Date*

The estimated commencement date is October 1, 2020. This date may be pushed back later to ensure all livestock have been relocated from the area pre-treatment.

2.4 *Name and Location of the Project*

Goldfish treatment near Zortman, MT will remove an invasive population of goldfish and eliminate the chance for this population to establish and inhabit downstream locations.

The unnamed stock pond located on private land is located in the Fort Peck watershed, which drains to the Missouri River, near the headwaters of Fort Peck Reservoir (Figure 2). The project is in Phillips County, approximately 1 mile from Zortman, Montana. The legal description is Township 25N, Range 25E in section 21.

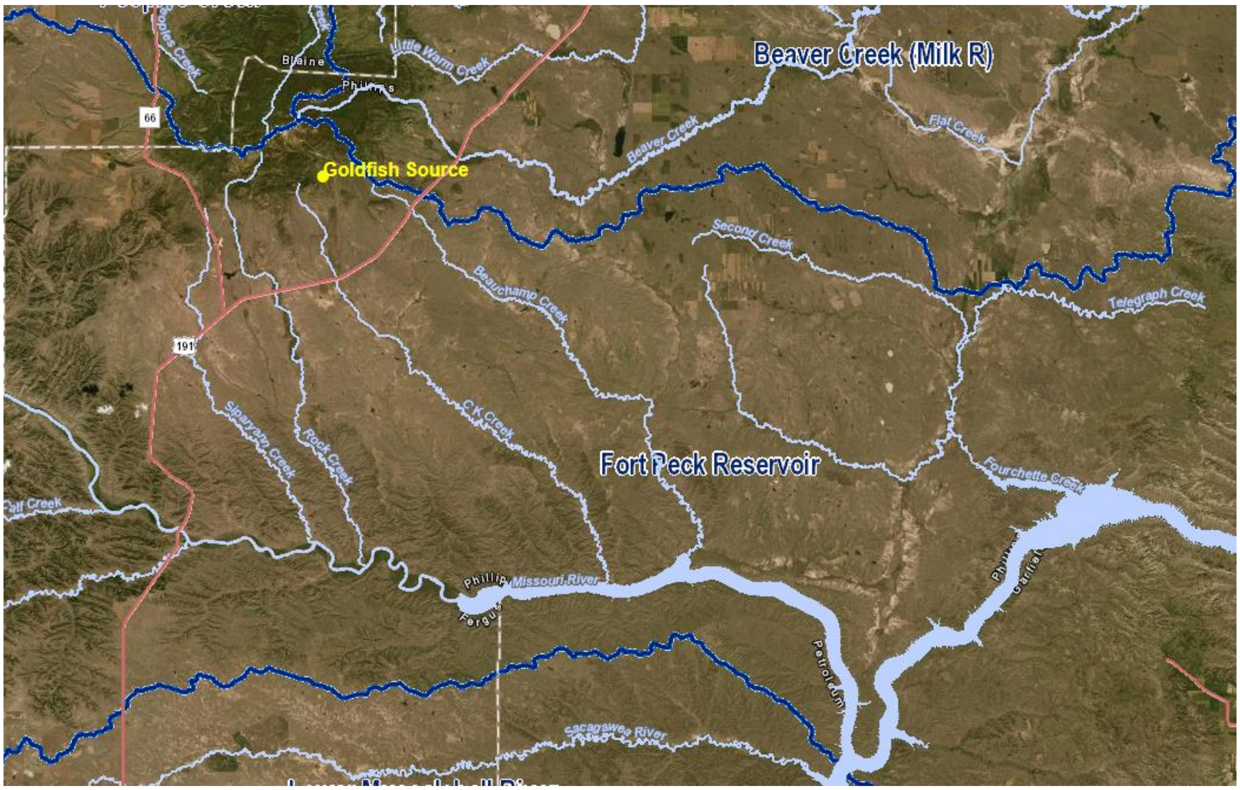

Figure 2. Map of project area.

2.5 *Project Size (Affected Area)*

1.	Developed/residential	0 acres
2.	Industrial	0 acres
3.	Open space/woodland/recreation	0 acres
4.	Wetlands/riparian areas	1 acre
5.	Floodplain	0 acres
6.	Irrigated cropland	0 acres
7.	Dry cropland	0 acres
8.	Forestry	0 acres
9.	Rangeland	23 acres

The pond has a surface area of 0.65 acres at full pool. Its maximum depth is 6 feet, and the pond is approximately 2.64-acre feet in volume. There's one spring that feeds the pond and an earthen spillway provides the only outlet (Figure 3).

Figure 3. Location of known inlets and outlets as well as an approximate depth profile of the pond containing the goldfish population.

2.6 *Narrative Summary of the Proposed Action and the Purpose of the Proposed Action*

2.6.1 Summary and Background

Goldfish are an invasive species that can impact both native fish and non-native gamefish. In 2016, goldfish were observed in an unnamed pond located within one mile of Zortman, MT. The population was a result of an illegal introduction that likely started with just a few individuals. The population is now established, with several year-classes of goldfish being represented within the population, indicating natural reproduction and overwintering conditions are favorable.

In November 2016, MFWP attempted to pump down the pond and manually remove all the goldfish. This attempt failed and the goldfish population continues to reproduce and increase in population density.

2.6.2 Proposed Action

The project will utilize the piscicide Prenfish to completely remove all goldfish located in the pond to eliminate the risk of goldfish spreading to downstream locations. Once treated, no fish will be introduced into the pond given the size, shallow depths, and historical use as a stock water pond for livestock. No historic fishery existed in this pond.

2.6.3 Method of Fish Removal

The chemical proposed for removal of fish uses rotenone as its active agent. Rotenone is a naturally occurring substance derived from the roots of tropical plants in the bean family such as the jewel vine (*Derris* spp.) and lacepod (*Lonchocarpus* spp.) that are found in Australia, Oceania, southern Asia, and South America. Rotenone has been used by native people for centuries to capture fish for food in areas where these plants are naturally found. It has been used in fisheries management in North America since the 1930s

2.6.4 How Does It Work?

Rotenone is applied to the water and enters the fish through the gills. It is effective at very low concentrations with fish because it is readily absorbed into the bloodstream through the thin cell layer of the gills. Mammals, birds and other non-gill breathing organisms do not have this rapid absorption route into the bloodstream and are not affected by consuming treated water or dead fish at concentrations used in fisheries management. Rotenone kills fish by interrupting the Krebs Cycle in individual cells.

2.6.5 Treatment Area

The treatment area will be focused on the pond. Two additional areas that will be treated based on water conditions are in the arms at the upper end of the pond. At these locations there is some ground water influence that will require treatment in addition to the pond itself. The treatment area will end at the overflow spillway located at the northeastern corner of the pond (Figure 4).

Figure 4. Project area showing proposed extent of treated water.

Waters within the project area would be treated with Prenfish. Label guidelines for pond treatments range from 3.0 and 4.0 ppm. The exact concentration of the selected formulation will be determined in the field, by conducting bioassays on caged fish, with the intent of determining the lowest dose that will meet the project objective of eradication of fish in the project area.

Studies (Marking and Bills 1976) show goldfish can survive exposure to levels much higher than prescribed by the (Prenfish) label, which is why we anticipate a treatment of 4 ppm.

The unnamed pond has a volume of 2.64 acre-feet. Approximately 3.4 gallons of Prenfish is required to achieve 4 ppm treatment concentration. Prenfish would persist in the lake for 2 to 3 weeks, depending on water temperature, sunlight, alkalinity and the amount of fresh water entering the lake from contributing tributaries.

The pond is relatively remote and difficult to access. Access to the treatment area will be closed during the application of rotenone. Signs will be placed at gates, trails, and other avenues where access to the treatment area can be obtained. Human access within the treatment area will be restricted for up to 30 days. FWP will coordinate with the landowner to ensure treatment of the pond occurs after the summer/fall grazing period of livestock in the area, which occurs from May 1-October 1 (or later).

2.6.6 Method of Application

The application of rotenone will depend on the time of year. If access is good during the winter, holes will be augured through the ice and Prenfish will be applied throughout the pond. If treatment is done during open water, Prenfish will be dispensed in the pond by boat. Backpack sprayers would be used to dispense the Prenfish in the marshy areas around the lake and to the backwaters of the pond. The materials and equipment would be transported to the site by truck. Treatment would last for approximately 4 hours. When the treatment ends, freshwater entering the lake via ground water and precipitation would dilute the Prenfish, contributing to its degradation.

Deactivation

The pond being treated is in a closed basin (i.e. no surface outflows), the rotenone will degrade naturally (photodegradation, dilution, organic uptake, and thermal), and deactivation with potassium permanganate ($KMnO_4$) is not anticipated. However, potassium permanganate will be available if pre-treatment surveys identify the need (surface outflow) to deactivate during the treatment.

It is required as per the FWP's piscicide policy (2012) that a block net be installed at the end of the deactivation zone to prevent dead fish from drifting downstream of the project area. The block net will be placed across the outlet spillway if treatment is done during the open water season. If the treatment is done during the winter, no block net will be used.

2.6.7 Fate of Dead Fish

Dead fish that surface would be left on-site in the water or disposed in a local landfill. In lakes, 70% of rotenone-killed fish sink to the bottom (Bradbury 1986), where they are not visible. Bacteria and aquatic invertebrates promote rapid decay of fish carcasses, and nutrients contributed from dead fish stimulate recovery of zooplankton and other aquatic invertebrates. Terrestrial scavengers contribute to the disappearance of carcasses, and piscicide-killed fish do not present health risks to organisms consuming them. Dead fish generally decay beyond recognition within 1 to 2 weeks.

2.6.9 Duration of project

If all the fish are not removed during the first treatment, it may be necessary to implement additional treatments to achieve the desired objectives. The metrics we would use to determine success include visual, trap, and gill net surveys. If goldfish remain after the first treatment, a second or third treatment may be conducted as soon as conditions and livestock operations allow for subsequent treatment to occur.

2.6.10 Monitoring

Monitoring is an important component of this type of management activity (Meronek et al. 1996). Recovery of benthic macroinvertebrate species will be evaluated over two successive years by collecting kick samples at two sites in the treatment area.

3 Environmental Review

3.1 *Physical Environment*

3.1.1 Land Resources

LAND RESOURCES **Will the proposed action result in:**	**IMPACT Unknown**	**None**	**Minor**	**Potentially Significant**	**Can Impact Be Mitigated**	**Comment Index**
a. Soil instability or changes in geologic substructure?		X				
b. Disruption, displacement, erosion, compaction, moisture loss, or over-covering of soil which would reduce productivity or fertility?		X				
c. Destruction, covering or modification of any unique geologic or physical features?		X				
d. Changes in siltation, deposition or erosion patterns that may modify the channel of a river or stream or the bed or shore of a lake?		X				
e. Exposure of people or property to earthquakes, landslides, ground failure, or other natural hazard?		X				

3.1.2 Water

WATER **Will the proposed action result in:**	**IMPACT Unknown**	**None**	**Minor**	**Potentially Significant**	**Can Impact Be Mitigated**	**Comment Index**
a. Discharge into surface water or any alteration of surface water quality including but not limited to temperature, dissolved oxygen or turbidity?			X		YES	2a
b. Changes in drainage patterns or the rate and amount of surface runoff?		X				
c. Alteration of the course or magnitude of flood water or other flows?		X				
d. Changes in the amount of surface water in any water body or creation of a new water body?		X				

e. Exposure of people or property to water related hazards such as flooding?		X				
f. Changes in the quality of groundwater?		X				2b
g. Changes in the quantity of groundwater?		X				
h. Increase in risk of contamination of surface or groundwater?			X		YES	see 2ab
i. Effects on any existing water right or reservation?		X				
j. Effects on other water users as a result of any alteration in surface or groundwater quality?		X				See 2c
k. Effects on other users as a result of any alteration in surface or groundwater quantity?		X				
l. Will the project affect a designated floodplain?		X				
m. Will the project result in any discharge that will affect federal or state water quality regulations? (Also see 2a)			X		YES	2d

Comment 2a

The proposed project is designed to intentionally introduce a pesticide to surface water to remove invasive fish. The impacts would be short term and minor. Prenfish (5% liquid) and Prentox (7% powder) rotenone are EPA registered pesticides and are safe to use for removal of unwanted fish, when handled properly. The concentration of Prenfish (5% liquid) and Prentox (7% powder) proposed is 3.0-4.0 ppm in water but could be adjusted within the label-allowed limits based upon the results of on-site assays.

Two springs were identified during pretreatment surveys. We expect the springs to detoxify within 48 hours after rotenone application, we expect the pond to detoxify naturally within 2 to 3 weeks.

Several factors influence rotenone's persistence and toxicity. Warmer water temperatures promote deactivation. Rotenone has a half-life of 14 hours at 24 °C, and 84 hours at 0 °C (Gilderhus et al. 1986, 1988), meaning that half of the rotenone is deactivated and is no longer toxic in that time. As temperature and sunlight increase, so does deactivation of rotenone. Higher alkalinity (>170 mg/L) and pH (>9.0) also increase the rate of deactivation. Rotenone tends to bind to, and react with, organic molecules, and availability of organic matter substantially decreases the persistence of rotenone (Dawson et al. 1991). Dilution from groundwater inputs or tributary streams also contributes to deactivation of rotenone

Dead fish would result from this project, although dead fish sink and rapidly decompose, a relatively small proportion of dead fill would be noticeable. In Washington lakes, approximately 70 % of rotenone-killed fish did not surface (Bradbury 1986).

Decomposition of rotenone-killed fish in lakes can result in temporary nutrient enrichment and algal blooms. In Washington, 9 of 11 treated with rotenone experienced an algal bloom shortly after treatment, and an estimated 70 % of the phosphorus of the fish stock would remain in the lake with decomposition of fish (Bradbury 1986). Nutrient loading from fish left to decay may temporarily contribute to aesthetically unappealing algal blooms; however, keeping the nutrients within the body of water is beneficial. Fish left in a treated lake contribute towards food web recovery, as the nutrients contributed from their decomposing bodies stimulates phytoplankton production, which in turn feed zooplankton that recolonize treated lakes. Natural recolonization of zooplankton and other aquatic invertebrates result in reestablishment of the forage base for fish. Any changes or impacts to water quality resulting from decaying fish would be short term and minor.

Comment 2b

No contamination of groundwater is anticipated to result from this project. Because ground water leaving the unnamed pond must travel through bed sediments, soil, and gravel, and rotenone is known to bind readily with these substances, we do not anticipate any contamination of ground water (Skaar 2001; Engstrom-Heg 1971, 1976; Ware 2002). Rotenone moves only one inch in most soil types; the only exception would be sandy soils where movement is about three inches (Hisata 2002). In California, studies where wells were placed in aquifers adjacent to and downstream of rotenone applications have never detected rotenone, rotenolone, or any of the other organic compounds in the formulated products (CDFG 1994).

Case studies in Montana have concluded that rotenone movement through groundwater does not occur (FWP unpublished data). For example, at Tetrault Lake, Montana neither rotenone nor inert ingredients were detected in a nearby domestic well, which was sampled two and four weeks after applying 1.8 ppm rotenone to the lake. This well was chosen because it was down gradient from the lake and drew water from the same aquifer that fed and drained the lake. FWP has sampled wells and groundwater in several piscicide projects that removed fish from ponds, and no rotenone, or the inert ingredients of the selected formulation were detected in ponds ranging from 65 to 200 feet from the treated waters. Likewise, application of piscicide to streams has not resulted in contamination of neighboring wells or groundwater. In 2015 and 2016, Soda Butte Creek flowing through Cooke City and Silver Gate, Montana was treated with CFT Legumine. Wells drawing water from the same open aquifer as the treated stream were sampled during and after the treatment and all found to be free of rotenone.

Comment 2c

The Prenfish label states… "Do not use water treated with rotenone to irrigate crops or release within ½ mile upstream of an irrigation water intake in a standing body of water such as a lake, pond, or reservoir. For applications > 40 ppb or 0.04 ppm active rotenone (> 0. 8 ppm 5 % rotenone formulation) in waters with drinking water intakes or hydrologic connections to wells, 7 to 14 days before application, the certified applicator or designee under his/her direct supervision must notify to the party responsible for the public water supply, or individual private water users, to avoid consumption of treated water until: (1) active rotenone is < 0. 04 ppm as determined by analytical chemistry, (2) fish of the *Salmonidae* or *Centrarchidae* families can survive for 24 hours, (3) dilution with untreated water yields a calculation that active rotenone is < 0. 04 ppm, or (4) distance or travel time from the application sites demonstrates that active rotenone is < 0. 04 ppm. There are no water intakes associated with this pond and the project will have no impact.

Comment 2d

The 2016 Pesticide General Permit issued on a five-year cycle by Montana DEQ provides the authority for FWP to apply piscicides. FWP, and any other piscicide applicator, must develop a pesticide discharge management plan as a condition for coverage under this permit. For FWP, the plan consists of procedures and protocols developed by and detailed in FWP's Piscicide Policy, the AFS Rotenone Standard Operating Procedures manual, and annual training and critique of projects provided by the FWP Piscicide Committee.

3.1.3 Air

AIR **Will the proposed action result in:**	**IMPACT** **Unknown**	**None**	**Minor**	**Potentially** **Significant**	**Can Impact Be Mitigated**	**Comment Index**
a. Emission of air pollutants or deterioration of ambient air quality? (also see 13 (c))			X			3a
b. Creation of objectionable odors?			X		yes	3b
c. Alteration of air movement, moisture, or temperature patterns or any change in climate, either locally or regionally?		X				
d. Adverse effects on vegetation, including crops, due to increased emissions of pollutants?		X				

e. Will the project result in any discharge which will conflict with federal or state air quality regulations?		X				

Comment 3a

Outboard motors and generators, if used, create emissions; however, these emissions would dissipate rapidly. Any impacts from these odors would be short term and minor.

Comment 3b

Prenfish liquid formulated rotenone contains aromatic solvents that make it soluble in water. The smell of these solvents, primarily naphthalene, may last for several hours to several days, depending on air and water temperatures and wind direction. These relatively heavy organic compounds tend to sink (remain close to the ground) and move downwind. The California Department of Pesticide Regulation (CDPR 1998, cited in Finlayson et al. 2000) found no health effects from this smell. Applicators would have the greatest contact with these odors but would be protected because they would be wearing respirators as the product label recommends. Any impacts caused by objectionable odors would be short term and minor.

Dead fish would result from this project and may cause objectionable odors (See Section 2a). This would be mitigated by collecting and/or sinking dead fish in the pond. We would expect odors from dead fish to be short term and minor as most dead fish sink to the bottom and decay and do not float, complete decomposition would be expected in 1-2 weeks.

3.1.4 Vegetation

VEGETATION **Will the proposed action result in:**	**IMPACT Unknown**	**None**	**Minor**	**Potentially Significant**	**Can Impact Be Mitigated**	**Comment Index**
a. Changes in the diversity, productivity or abundance of plant species (including trees, shrubs, grass, crops, and aquatic plants)?			X			4a
b. Alteration of a plant community?		X				
c. Adverse effects on any unique, rare, threatened, or endangered species?			X			4b
d. Reduction in acreage or productivity of any agricultural land?		X				

e. Establishment or spread of noxious weeds?		X				
f. Will the project affect wetlands, or prime and unique farmland?		X				

Comment 4a

The unnamed pond is in a grassland area with an enclosure fence. There will be minor trampling of vegetation around the pond and at locations immediately upstream and downstream. Rotenone does not affect plants at concentrations used to kill fish. Impacts from trampling vegetation are expected to be short term and minor and should be fully healed within 1 growing season.

Comment 4b

Rotenone has no impacts on plant species at fish killing concentrations. The only anticipated impacts to sensitive plant species would be a result of trampling by the personnel applying the rotenone to the stream and any impacts from trampling are expected to be short term and minor. Any trampling impacts should be fully healed within 1 growing season. Impacts to sensitive plants can be minimized by staying as much as possible on existing road and trail systems.

3.1.5 Fish/Wildlife

FISH/WILDLIFE **Will the proposed action result in:**	**IMPACT Unknown**	**None**	**Minor**	**Potentially Significant**	**Can Impact Be Mitigated**	**Comment Index**
a. Deterioration of critical fish or wildlife habitat?		X				
b. Changes in the diversity or abundance of game animals or bird species?		X				
c. Changes in the diversity or abundance of nongame species?			X		yes	5a
d. Introduction of new species into an area?		X				
e. Creation of a barrier to the migration or movement of animals?		X				
f. Adverse effects on any unique, rare, threatened, or endangered species?			X			5b
g. Increase in conditions that stress wildlife populations or limit abundance (including		X				5c

harassment, legal or illegal harvest or other human activity)?						
h. Will the project be performed in any area in which T&E species are present, and will the project affect any T&E species or their habitat? (Also see 5c)		X				
i. Will the project introduce or export any species not presently or historically occurring in the receiving location?		X				

Comment 5a

In October 2019, surveys were conducted on the pond for non-game species, which resulted in observing one common garter snake and one Northern leopard frog. Zooplankton and Gammarus were observed in the pond.

Fish
Rotenone is highly toxic to fish and other gill breathing organisms. The objective of this project is full eradication of goldfish. The removal of this goldfish population will eliminate the likelihood of this invasive species to relocate and establish downstream and compete with native prairie fishes.

Mammals
Ingestion of rotenone, either from drinking rotenone-treated water or from consuming dead fish or invertebrates from rotenone-treated streams, are the likely routes of exposure for mammals. A substantial body of research has investigated the effects of ingested rotenone in terms of acute and chronic toxicity and other potential health effects. In general, mammals are not affected by rotenone at concentrations used to kill fish. Consuming treated water or rotenone killed fish does not affect mammals at fish killing concentrations because rotenone is neutralized by enzymatic action in their stomach and intestines (AFS 2002). Investigations examining the potential for acute toxicity from ingesting rotenone find that mammals would need to consume impossibly high amounts of rotenone-treated water or rotenone-killed fish to obtain a lethal dose. For example, a 22-pound dog would have to drink nearly 8,000 gallons of treated water within 24 hours or eat 660,000 pounds of rotenone-killed fish within a day to receive a lethal dose (CDFG 1994). A half-pound mammal would need to consume 12.5 mg of pure rotenone or drink 66 gallons of treated water for a lethal dose (Bradbury 1986). The effective concentration of rotenone to kill fish is 0.5 to 1.0 ppm, which is several orders of magnitude lower than concentrations that result in acute toxicity to mammals. Evaluations of mammals' potential exposure to rotenone from scavenging indicate that acute toxicity from ingesting rotenone-killed fish is highly unlikely (EPA 2007).

Chronic toxicity associated with availability of dead fish over time would not pose a threat to mammals, nor would other health effects be likely. Rats and dogs fed high levels of rotenone for 6 months to 2 years experienced only diarrhea, decreased appetite, and weight loss (Marking 1988). The unusually high treatment concentrations did not cause tumors or reproductive problems. Toxicology studies investigating potential secondary effects of rotenone exposure have found no evidence that it results in birth defects (HRI 1982), gene mutations (BRL 1982; Van Geothem et al. 1981), or cancer (Marking 1988). Rats fed diets laced with 10 to 1000 ppm of rotenone over a 10-day period did not experience any reproductive dysfunction (Spencer and Sing 1982). Therefore, chronic exposure to rotenone poses no threat to mammals consuming dead fish or treated water. Rotenone does not persist in the environment which also limits the chronic exposure to mammals or other terrestrial organisms. In the unnamed pond rotenone is expected to persist 2-3 weeks thus limiting the potential for chronic exposure.to mammals.

A temporary reduction in prey of aquatic origin has the potential to influence some mammals. The American mink is a piscivorous mammalian that could occur in the project area. Mink are opportunistic predators and scavengers, with fish and invertebrates comprising a portion of their diet. Therefore, the reduction in density of fish following treatment may displace mink to adjacent, untreated reaches until fish populations recover. Nonetheless, as opportunists, American mink have flexibility to switch to other prey species and can disperse.

Other mammalian predators may experience short-term and minor consequences. Opportunistic black bears (*Ursus americanus*), raccoons (*Procyon lotor*), red foxes (*Vulpes vulpes*), coyotes (*Canis latrans*), and striped skunks (*Mephitis mephitis*) would likely consume dead fish immediately after piscicide treatment. The temporary reductions of aquatic prey, and the brief availability of dead fish, constitute short-term and minor effects on mammalian predators and scavengers.

Birds

Birds have the potential to be exposed to rotenone through ingestion of treated water or scavenging dead fish and invertebrates. Like with mammals, rotenone breaks down rapidly within the gut of birds. Moreover, the concentrations of rotenone in waters treated for fisheries management are far below levels found to be toxic to birds. For example, ¼-pound bird would have to consume 100 quarts of treated water, or more than 40 pounds of fish and invertebrates, within 24 hours, for a lethal dose (Finlayson et al. 2000). The EPA concluded that exposure to rotenone, when applied according to label instructions, presented no unacceptable risks to wildlife (EPA 2007). In summary, this project would have no adverse effect birds that ingest water, dead fish, or dead invertebrates.

Reptiles

Reptiles, especially garter snakes, have potential to be exposed to rotenone treated water and could scavenge dead fish. The low concentration of rotenone in water and dead fish indicates reptiles would not experience toxic exposure to rotenone. Moreover, the reptilian gut is likely as efficient, or more efficient, at breaking down rotenone given the ability of reptiles to digest bone, hair, and exoskeletons, all of which are far less degradable than the rotenone molecule.

Amphibians

Amphibians are closely associated with water and have potential to be exposed to rotenone during treatment. In general, adult, air-breathing amphibians are not affected by rotenone at fish killing concentrations (Chandler and Marking 1982, Grisak et al. (2007) but the larvae would likely be affected (Grisak et al 2007, Billman et al 2011). Billman et al. (2011) conducted laboratory toxicity tests of the impacts of rotenone on Columbia spotted frogs and Boreal toads. They found significant mortality to the larval stages of both species if they are exposed for 96 hours to 1 ppm CFT Legumine, but the mortality was less when exposed to lower dosages (0.5 ppm) or for a shorter duration (4 hours or less). In Yellowstone Park rotenone caused nearly 100% mortality in gill-breathing, amphibian tadpoles within 24 hours, but did not affect non-gill breathing metamorphs, juveniles, or adults. In the year(s) following, tadpole repopulation occurred at all water bodies treated with CFT Legumine and population levels were similar to or higher than, pre-treatment levels (Billman et al. 2012). Olsen (2017) found that a concentration of 1 ppm rotenone in the West Fork of Mudd Creek produced 100% mortality of tailed frog tadpoles, but concentrations of 0.75, 0.5 and 0.25 mortality averaged only 33%. To mitigate for the potential impacts to larval stages of amphibians, the treatment will be performed in the fall or winter.

Table 2. Amphibians with potential to be exposed to rotenone in piscicide projects (from [Montana Natural Heritage Program](#)).

Order	Common Name	Scientific Name	Gilled Phase Coincide with late fall/early winter piscicide treatment	Status
Caudata/ salamanders	Western tiger salamander	*Ambystoma mavortium*	Yes, neotenic adults	G5, S4
Ranidae/ frogs	Northern Leopard Frog	*Lithobates pipiens*	No	G5, S4

[1] G3 = Globally the species is potentially at risk because of limited and/or declining numbers, range and/or habitat, even though it may be abundant in some areas.
[2]S2 = In Montana, at risk due to very limited and/or potentially declining population numbers, range and/or habitat, making vulnerable to extirpation.
[3]G4 = Globally, is apparently secure, although it may be rare in parts of its range, and/or suspected to be declining.
[4]G5 = Globally, the species is common, widespread, and abundant, although it may be rare in parts of its range. The species is not vulnerable in most of its range.

[5]S4 = In Montana, the species is apparently secure, although it may be rare in parts of its range, and/or suspected to be declining.

The potential to be exposed to rotenone varies by species. In mountain lakes, western tiger salamanders are present as gill-bearing adults, or axolotls. At lower elevations, western tiger salamanders exist as terrestrial adults, gilled larvae, and neotenic adults. Little information is available on toxicity of rotenone to western salamanders, although larval salamanders were presumed to be as vulnerable to rotenone as fish (Maxell and Hokit 1999). Nevertheless, observations of substantial numbers of neotenic forms in a reservoir a year after rotenone achieved eradication of fish suggests some resilience to rotenone (Jim Olsen, FWP personal communication). Moreover, western tiger salamanders are resilient to loss of a year class (Bryce Maxell, MNHP, personal communication). Frequently, the older year class of western tiger salamander larvae will cannibalize the newer generation. This strategy ensures the success of the older year class, resulting in staggered year class success.

Clearly, insufficient information is available to draw strong conclusions on the potential for western tiger salamanders to be negatively affected by rotenone treatment. Should native fish conservation projects be considered in waters supporting larval or neotenic western tiger salamanders, bioassays should be performed to evaluate their response to rotenone exposure. Projects should proceed if no long-term population level effects are expected based on tolerance to rotenone, existence of life-history strategies that allow for recovery, or when mitigative actions prevent long-term effects on western tiger salamander populations.

Like gill-bearing aquatic macroinvertebrates, frog and toad larvae are sensitive to rotenone, and exposure to rotenone at levels used to kill fish is acutely toxic to Columbian spotted frog larvae, Rocky Mountain tailed frog larvae, and western toad larvae (Grisak et al. 2007; Billman et al. 2012). Although tadpoles may be vulnerable to rotenone, at least some species may be up to 10 times more tolerant than fish (Chandler and Marking 1982). Treatment in late summer or early fall is a recommended practice to prevent effects on frogs and toads, as many are past the gilled life history stage (Grisak et al. 2007). In the short-term, this practice may not be protective of species that remain as gilled larvae for more than 1 year, or at high elevations, where delay in the breeding season and low temperatures delay metamorphosis. Nevertheless, toads and frogs have considerable potential to recover from this short-term disturbance.

Variability of tolerance to rotenone among species of toad and frog is unknown; however, evidence for resilience to rotenone of other species suggests a general tolerance is possible. A study in Norway examined the response of lake-dwelling amphibians, the common frog (*Rana temoraria*) and common toad (*Bufo bufo*), to treatment with CFT Legumine (Amekleiv et al. 2015). These species were observed before and 1 year after treatment with rotenone, with adults, eggs, and tadpoles being present following treatment. They concluded CFT Legumine had little effect on these species.

Zooplankton

Rotenone has greater initial effects on abundance and diversity of zooplankton than lotic invertebrates, given the longer period of exposure (Vinson et al. 2010). Biomass of zooplankton recovers rapidly; however, zooplankton community composition can take from 1 week to 3 years to return to pretreatment conditions (Beal and Anderson 1993: Vinson et al. 2010). Like stream-dwelling invertebrates, zooplankton have life history strategies that aid in rapid recolonization following disturbance (Havel and Shurin 2004). Recovery of zooplankton varies among taxa, with a dramatic bloom of early colonizers in the first couple of months (Anderson and Beal 1993). Other taxa take longer to recover, but the diversity and abundance can return as quickly as 6 months. Post-treatment monitoring in Devine Lake in the Bob Marshall Wilderness found invertebrates increased in number and very slightly increased in diversity following a rotenone treatment (Rumsey et al. 1996). Schnee (2007b) chronicled two years of post-rotenone treatment monitoring for upper and lower Martin lakes near Olney, Montana that were treated with rotenone in 2005. He concluded that zooplankton density two years after the treatment were similar to pre-treatment densities, and in some cases higher. In a Norwegian lake, the zooplankton were sampled before application of CFT Legumine in 2014, immediately after treatment, and 1-year post-treatment in 2015 (Amekleiv et al. 2015). CFT Legumine had an initial negative effect on zooplankton, with none being detected immediately after treatment. The relative abundance of species of zooplankton changed from pretreatment to 1-year post-treatment with some species comprising a much higher proportion of the zooplankton community. In addition, overall abundance of zooplankton increased considerably post treatment. Removal of common roach (*Rutilus rutilus*), a species of minnow that preys on zooplankton, was attributed to greater post-treatment plankton biomass. Many taxa of zooplankton are capable of asexual reproduction, which favors rapid recolonization from existing eggs and zooplankters that survived treatment. Moreover, lakes have a long-term bank of dormant eggs that are resilient to a range of harsh conditions and provide many years of recruitment of zooplankton within a lake. In addition, wind, animals, and humans are primary agents of dispersal of dormant eggs. Based on these studies and characteristics of zooplankton communities, we would expect the plankton species composition in the unnamed pond to return to pre-treatment diversity and abundance within two years and the impacts of treatment with rotenone to be short term and minor. Leaving dead fish within the lake likely provides the nutrients for recovery of lentic invertebrates, and 70 % of dead fish do not surface (Bradbury 1986).

Stream-Dwelling Aquatic Invertebrates

Investigations into the effects of rotenone on benthic organisms indicate that rotenone can result in temporary reduction of gilled aquatic invertebrates in streams. Invertebrates that were most sensitive to rotenone also tended to have the highest rate of recolonization due to short life cycles (Engstrom-Heg et al. 1978). Although gill-respiring invertebrates are a sensitive group, many are far less sensitive to rotenone than fish (Schnick 1974; Chandler and Marking 1982; Finlayson et al. 2010). Due to their short life cycles (Anderson and Wallace 1984), strong dispersal ability (Pennack 1989), and generally high reproductive potential (Anderson and Wallace 1984), aquatic invertebrates are capable of rapid recovery from disturbance (Boulton et al. 1992; Matthaei et al. 1996). Following a piscicide treatment of a California stream, macroinvertebrates experienced a resurgence in numbers, with black fly larvae recovering first, followed by mayflies and caddisflies within six weeks after treatment (Cook and Moore 1969). Stoneflies returned to pretreatment abundances by the following spring. Studies suggesting long-term reductions in biomass and presumed absence of species following piscicide treatment examined treatments with markedly higher concentrations and durations of piscicide exposure, with a subsequent treatment occurring within a month of the first treatment (Mangum and Madrigal 1998).

A study of response of benthic invertebrates in streams in Montana and New Mexico used a concentration and duration of CFT Legumine similar to the one that is proposed in this project (Skorupski 2011). In Cherry Creek and Specimen Creek, both in Montana, rotenone resulted in minimal effects on macroinvertebrates immediately after. Rotenone had a greater effect on benthos in streams in New Mexico. Regardless of the initial response, invertebrate communities recovered in all streams within a year. In Norway CFT Legumine was applied at of 0.5 ppm, which is lower than the 1 ppm typical of most piscicide projects in Montana and despite initial reductions in invertebrate abundance, most taxa had recolonized with a year (KJærstad et al. 2014).

Because piscicide has potential to alter abundance and species composition of aquatic invertebrates over the short-term, FWP's Piscicide Policy requires pretreatment sampling of benthic, aquatic invertebrates (FWP 2012).

Lakes- basic plankton, amphibian and insect monitoring.

Based on the information collected from the unnamed pond and the studies reviewed above, FWP would expect the aquatic invertebrate species composition and abundance in the streams/lakes proposed for treatment with rotenone at concentrations 3.0-4.0 ppm to return to pre-treatment diversity and abundance within one to two years after treatment. Therefore, the impacts to aquatic invertebrate communities should be short-term and minor.

Pre and post-treatment surveys will be conducted to evaluate the response of aquatic invertebrates.

Mussels and Clams

No mussels or clams were observed in the unnamed pond when water levels were reduced during the initial attempt to remove goldfish in 2016.

Comment 5b

It is possible that osprey or eagles would consume rotenone-killed fish. The pond historically had no fish present. However, several nearby ponds contain viable fish populations that will maintain a sustainable food source for resident osprey or eagles. See comment 5a for impacts to birds.

Comment 5c

Human activity will be limited to less than a week during the treatment of the pond. This activity may affect local wildlife movements for a brief period.

3.2 *Human Environment*

3.2.1 Noise/Electrical Effects

6. NOISE/ELECTRICAL EFFECTS Will the proposed action result in:	IMPACT Unknown	None	Minor	Potentially Significant	Can Impact Be Mitigated	Comment Index
a. Increases in existing noise levels?			X			6a
b. Exposure of people to serve or nuisance noise levels?		X				
c. Creation of electrostatic or electromagnetic effects that could be detrimental to human health or property?		X				
d. Interference with radio or television reception and operation?		X				

Comment 6a

The unnamed pond is located close to the town of Zortman and is in close proximity to a highway. The only noise generated from this project would be from an outboard motor and generator, if used, but is consistent with present levels. The noise generated from this would be short term and minor.

3.2.2 Land Use

7. LAND USE Will the proposed action result in:	IMPACT Unknown	None	Minor	Potentially Significant	Can Impact Be Mitigated	Comment Index
a. Alteration of or interference with the productivity or profitability of the existing land use of an area?		X				

b. Conflicted with a designated natural area or area of unusual scientific or educational importance?		X				
c. Conflict with any existing land use whose presence would constrain or potentially prohibit the proposed action?			X			7a
d. Adverse effects on or relocation of residences?		X				

Comment 7a

If the treatment is done during the winter no social impacts would occur. If the treatment is done in the fall, the project would be located on a Block Management Area during the general deer and elk season. Activity around the pond during this project may displace some animals sought for this type of hunting. Any impacts from this displacement would be short term and minor. The main access road to the pond would be closed during the treatment and the pasture where the pond is located is classified as a “walk-in only” access for hunters. Signs, indicating a chemical treatment to eradicate goldfish would be placed around the pond. Any social impacts to hunters who use this area would be short term and minor.

3.2.3 Risks/Health Hazards

8. <u>RISK/HEALTH</u> <u>HAZARDS</u> **Will the proposed action result in:**	**IMPACT Unknown**	**None**	**Minor**	**Potentially Significant**	**Can Impact Be Mitigated**	**Comment Index**
a. Risk of an explosion or release of hazardous substances (including, but not limited to oil, pesticides, chemicals, or radiation) in the event of an accident or other forms of disruption?			X		YES	8a
b. Affect an existing emergency response or emergency evacuation plan or create a need for a new plan?			X		YES	8b
c. Creation of any human health hazard or potential hazard?			X		YES	see 8ac
d. Will any chemical toxicants be used?			X		YES	see 8a

Comment 8a

The principal risk of human exposure to hazardous materials from this project would be limited to the applicators. All applicators would wear safety equipment required by the product label and SDS sheets. All applicators would be trained on the safe handling and application of the piscicide and potassium permanganate. Piscicide applicators become certified applicators upon passing examinations given by the Montana Department of Agriculture. Beyond this, FWP imposes additional requirements on its own employees through its internal piscicide policy (FWP 2012). An independent certified applicator must accompany each treatment, with "independent" status assigned to an individual who would not be expected to work on the treatment as part of their normal duties. Therefore, at least 2 Montana Department of Agriculture certified pesticide applicators would supervise and administer the project. Materials would be transported, handled, applied and stored according to the label specifications to reduce the probability of human exposure or spill.

Comment 8b

FWP requires a treatment plan for rotenone projects. This plan addresses many aspects of safety for people who are on the implementation team such as establishing a clear chain of command, training, delegation and assignment of responsibility, clear lines of communication between members, spill contingency plan, first aid, emergency responder information, personal protective equipment, monitoring and quality control, among others. Implementing this project should not have any impact on existing emergency plans. Because an implementation plan has been developed by FWP the risk of emergency response is minimal and any effects to existing emergency responders would be short term and minor.

Comment 8c

Information examined here includes an analysis of human health risks relating to rotenone exposure (EPA 2007, Fisher 2007). Acute toxicity refers to the adverse effects of a substance from either a single exposure or multiple exposures in a short space of time. Rotenone ranks as having high acute toxicity through oral and inhalation routes of exposure, and low acute toxicity through exposure to skin (EPA 2007). Acute toxicity would be applicable to undiluted rotenone formulation, with median lethal doses for rats ranging from 39. 5 mg/kg for female rats, and 102 mg/kg for male rats. A rat would need to ingest or inhale 0.04 g of undiluted rotenone for a lethal dose. As rotenone is 5% of most rotenone formulations, a 1 kg rat would have to consume 0.63mL of formulation to receive a lethal dose. Because the treatment area would be closed to public access during rotenone application, exposer of humans to undiluted 5% rotenone formulation would not occur. Only personnel involved in the project who actively measure and applying the chemical could be exposed. Oral or inhalation risks for these persons can be reduced or eliminated by proper use of personal protective equipment.

Chronic exposure is repeated oral, dermal, or inhalation of the target chemical (EPA 2007). In humans, chronic exposure is the length of time equivalent to approximately 10% of the life span. In piscicide treatments in streams, exposure to rotenone lasts at most 4 days. Therefore, the only people likely to experience chronic exposure are the applicators who dispense diluted CFT Legumine over multiple projects. The use of protective eyewear, gloves and dust/mist respirators (in the case of hand-held devices that dispense rotenone) is sufficient to protect worker health.

The analysis of dietary risks considered threats to the subgroup “females 13-49 years old” and examined exposure associated with consuming exposed fish and drinking treated surface water (EPA 2007). In determining potential exposure from consuming fish, the EPA used maximum residues in fish tissue. The concentrations of residue considered were conservative, meaning that they may have been an overestimate of the rotenone concentrations in muscle tissue, as they included unpalatable tissues, where concentrations may be higher. The EPA concluded that acute dietary exposure estimates resulted in a dietary risk below the EPA’s level of concern; therefore, consumption of fish killed by rotenone does not present an acute risk to the sensitive subgroup.

Table 3: Toxicological endpoints for rotenone (EPA 2007)

Exposure Scenario	**Dose Used in Risk Assessment, Uncertainty Factor (UF)**	**Level of Concern for Risk Assessment**	**Study and Toxicological Effects**
Acute Dietary (females 13-49)	NOAEL = 15 mg/kg/day UF = 1000 aRfD = 15 mg/kg/day = 0. 015 mg/kg/day 1000	Acute PAD = 0. 015 mg/kg/day	Developmental toxicity study in mouse (MRID 00141707, 00145049) LOAEL = 24 mg/kg/day based on increased resorptions
Acute Dietary (all populations)	An appropriate endpoint attributable to a single dose was not identified in the available studies, including the developmental toxicity studies.		
Chronic Dietary (all populations)	NOAEL = 0. 375 mg/kg/day UF = 1000 cRfD = 0. 375 mg/kg/day = 0. 0004 mg/kg/day 1000	Chronic PAD = 0. 0004 mg/kg/day	Chronic/oncogenicity study in rat (MRID 00156739, 41657101) LOAEL = 1. 9 mg/kg/day based on decreased body weight and food consumption in both males and females
Incidental Oral Short-term (1-30 days) Intermediate-term (1-6 months)	NOAEL = 0. 5 mg/kg/day	Residential MOE = 1000	Reproductive toxicity study in rat (MRID 00141408) LOAEL = 2. 4/3. 0 mg/kg/day [M/F] based on decreased parental (male and female) body weight and body weight gain
Dermal Short-, Intermediate-, and Long-Term	NOAEL = 0. 5 mg/kg/day 10% dermal absorption factor	Residential MOE = 1000 Worker MOE = 1000	Reproductive toxicity study in rat (MRID 00141408) LOAEL = 2. 4/3. 0 mg/kg/day
Inhalation Short-term (1-30 days) Intermediate-term (1-6 months)	NOAEL = 0. 5 mg/kg/day 100% inhalation absorption factor	Residential MOE = 1000 Worker MOE = 1000	[M/F] based on decreased parental (male and female) body weight and body weight gain
Cancer (oral, dermal, inhalation)	Classification; No evidence of carcinogenicity		

UF = uncertainty factor, NOAEL = no observed adverse effect level, LOAEL = lowest observed adverse effect level, aPAD = acute population adjusted dose, cPAD = chronic population adjusted does, RfD = reference dose, MOE = margin of exposure, NA = Not Applicable

The EPA analysis of acute dietary risk for both food and drinking water concluded;

> When rotenone is used in fish management applications, food exposure may occur when individuals catch and eat fish that either survived the treatment or were added to the water body (restocked) prior to complete degradation. Although exposure from this route is unlikely for the general U.S. population, some people might consume fish following a rotenone application. EPA used maximum residue values from a bioaccumulation study to estimate acute risk from consuming fish from treated water bodies. This estimate is considered conservative because the bioaccumulation study measured total residues in edible portions of fish including certain non-edible portions (skin, scales, and fins) where concentrations may be higher than edible portions (tissue) and the Agency assumed that 100% of fish consumption could come from rotenone exposed fish. In addition, fish are able to detect rotenone's presence in water and, when possible, attempt to avoid the chemical by moving from the treatment area. Thus, for partial kill uses, surviving fish are likely those that have intentionally minimized exposure.
>
> Acute exposure estimates for drinking water considered surface water only because rotenone is only applied directly to surface water and is not expected to reach groundwater. The estimated drinking water concentration (EDWC) used in dietary exposure estimates was 200 ppb, the solubility limit of rotenone. The drinking water risk assessment is conservative because it assumes water is consumed immediately after treatment with no degradation and no water treatment prior to consumption.
>
> Acute dietary exposure estimates result in dietary risk below the Agency's level of concern. Generally, EPA is concerned when risk estimates exceed 100% of the acute population adjusted dose (aPAD). The exposure for the "females 13-49 years old" subgroup (0.1117 mg/kg/day) utilized 74% of the aPAD (0.015 mg/kg/day) at the 95th percentile (see Table 5). It is appropriate to consider the 95th percentile because the analysis is deterministic and unrefined. Measures implemented as a result of this RED will further minimize potential dietary exposure (see Section IV).

As for evaluating the human chronic risk from exposure to rotenone treated water, the EPA acknowledges the four principle reasons for concluding there is a low risk. First, the rapid natural degradation of rotenone. Second, using active detoxification measures by applicators such as potassium permanganate. Next, properly following piscicide labels which prohibit the use near water intakes. Finally, proper signing, public notification or area closures which limit public exposure to rotenone treated water.

No recreational access (e.g., wading, swimming, boating, and fishing) would be allowed within the treatment area while rotenone is being applied. At applications rates less than 1.8 ppm there is no risk to human health after the chemical has been applied to the water and once the rotenone is mixed recreational access can be restored. At application rates greater than 1.8 ppm in streams recreational access can be removed 72 hours after application is complete. For lakes and ponds where rotenone is applied at 1.8 ppm or more, recreational access can be restored following a 24-hour bioassay demonstrating survival of sentinel fish or 14 days, whichever is less. The proposed treatment of the pond is at a concentration between 3.0-4.0 ppm. Access to the pond will be closed for 14 days, utilizing the existing enclosure fence and signing/posting potential access points. The aggregate risk to human health from food, water and swimming does not exceed the EPA level of concern (EPA 2007).

Recreationists in the area would likely not be exposed to the treatments because a temporary closure would preclude anyone from being in the area. Proper warning through news releases, signing the project area, road closure and administrative personnel in the project area should be adequate to keep unintended recreationists from being exposed to any treated waters. Dead fish would be collected and sunk in the pond or removed from the site.

Aside from the rotenone itself, liquid formulations [Prenfish] also consist of petroleum emulsifiers.

Finlayson et al. (2000) wrote regarding the health risks of these constituent elements:

> "…the EPA has concluded that the use of rotenone for fish control does not present a risk of unreasonable adverse effects to humans and the environment. The California Environmental Protection Agency found that adverse impacts from properly conducted, legal uses of liquid rotenone formulations in prescribed fish management projects were nonexistent or within acceptable levels (memorandum from J. Wells, California Department of Pesticide Regulation, to Finlayson, 3 August 1993). Liquid rotenone contains the carcinogen trichloroethylene (TCE). However, the TCE concentration in water immediately following treatment (less than 0.005 mg TCE per liter of water [5 ppb]) is within the level permissible in drinking water (0.005 mg TCE per liter of water, EPA 1980b). None of the other materials including xylenes, naphthalene, piperonyl butoxide, and methylnaphthalenes exceed any water quality criteria guidelines (based on lifetime exposure) set by the EPA (1980a, 1981a, 1993). Many of these materials in the liquid rotenone formulations (trichloroethylene, naphthalene, and xylene) are the same as those found in fuel oil and are present in waters everywhere because of the frequent use of outboard motors . . ."

California Department of Fish and Game (CDFG, 1994) calculated that the maximum expected level of these contaminants following a treatment level of 2 ppm formulation are TCE 1.1 ppb; toluene 84 ppb; xylenes 3.4 ppb; naphthalene 140 ppb.

The occupational risks to humans is low if proper safety equipment and handling procedures are followed as directed by the product labels (EPA 2007). The major risks to human health from rotenone come from accidental exposure during handling and application. This is the only time when humans are exposed to concentrations that are greater than that needed to remove fish. To prevent accidental exposure to liquid formulated or powdered rotenone, the Montana Department of Agriculture requires applicators to be:

- Trained and certified to apply the pesticide in use
- Equipped with the proper safety gear, which, in this case, includes
- respirator, eye protection, rubberized gloves, hazardous material suit
- Have product labels with them during use
- Contain materials only in approved containers that are properly labeled
- Adhere to the product label requirements for storage, handling, and
- Application

Any threats to human health during application would be greatly reduced with proper use of safety equipment.

There is an inhalation risk to ground applicators. To guard against this, ground applicators would be equipped with protective clothing, eye, and respirators.

To reduce the potential for exposure of the public to rotenone during the proposed treatment, areas treated with rotenone would be closed to public access. Placard signs would be placed at access points informing the public of the closure and the presence rotenone treated waters. Personnel would be onsite to inform the public and escort them from the treatment area should they enter. Rotenone treated waters would be contained to the proposed treatment areas by adding potassium permanganate to the stream at the downstream end of the treatment area (fish barrier). Potassium permanganate would deactivate any remaining rotenone before leaving the project area. The efficacy of the deactivation would be monitored using fish (the most sensitive species to the chemical) and a hand-held chlorine meter. Therefore, the potential for public exposure to rotenone treated waters is very minimal. The potential for exposure would be greatest for those certified applicators and operators applying the chemical. To reduce their exposure, label mandates for personal protective equipment would be adhered to (see Comment 8a).

3.2.4 Community Impact

9. COMMUNITY IMPACT Will the proposed action result in:	IMPACT Unknown	None	Minor	Potentially Significant	Can Impact Be Mitigated	Comment Index
a. Alteration of the location, distribution, density, or growth rate of the human population of an area?		X				
b. Alteration of the social structure of a community?		X				
c. Alteration of the level or distribution of employment or community or personal income?		X				
d. Changes in industrial or commercial activity?		X				
e. Increased traffic hazards or effects on existing transportation facilities or patterns of movement of people and goods?		X				

3.2.5 Public Services/Taxes/Utilities

10. PUBLIC SERVICES/TAXES/UTILITIES Will the proposed action result in:	IMPACT Unknown	None	Minor	Potentially Significant	Can Impact Be Mitigated	Comment Index
a. Will the proposed action have an effect upon or result in a need for new or altered governmental services in any of the following areas: fire or police protection, schools, parks/recreational facilities, roads or other public maintenance, water supply, sewer or septic systems, solid waste disposal, health, or other governmental services? If any, specify: ____________		X				
b. Will the proposed action have an effect upon the local or state tax base and revenues?		X				
c. Will the proposed action result in a need for new facilities or substantial alterations of any of the following utilities: electric power, natural		X				

gas, other fuel supply or distribution systems, or communications?						
d. Will the proposed action result in increased used of any energy source?		X				
e. Define projected revenue sources		X				
f. Define projected maintenance costs		X				

3.2.6 Aesthetics/Recreation

11. <u>AESTHETICS/RECREATION</u> **Will the proposed action result in:**	**IMPACT** **Unknown**	**None**	**Minor**	**Potentially** **Significant**	**Can Impact Be Mitigated**	**Comment Index**
a. Alteration of any scenic vista or creation of an aesthetically offensive site or effect that is open to public view?		X				
b. Alteration of the aesthetic character of a community or neighborhood?		X				
c. Alteration of the quality or quantity of recreational/tourism opportunities and settings? (Attach Tourism Report)		X				
d. Will any designated or proposed wild or scenic rivers, trails or wilderness areas be impacted?		X				

3.2.7 Cultural/Historic Resources

<u>12. CULTURAL/HISTORIC</u> **<u>RESOURCES</u>** **Will the proposed action result in:**	**IMPACT** **Unknown**	**None**	**Minor**	**Potentially** **Significant**	**Can Impact Be Mitigated**	**Comment Index**
a. Destruction or alteration of any site, structure or object of prehistoric historic, or paleontological importance?		X				

b. Physical change that would affect unique cultural values?		X				
c. Effects on existing religious or sacred uses of a site or area?		X				12a
d. Will the project affect historic or cultural resources?		X				

Comment 12a:

The project site is located within the aboriginal range of the Fort Belknap Indian Community. In April 2020, cultural officers for the tribe were contacted. To date there have been no cultural or religious resources identified at the project site. There will be no ground-breaking activities associated with this project, and no known cultural or religious ceremonies proposed for the same time this project is proposed. There will be no impacts to historical, cultural or religious values.

3.2.8 Summary Evaluation of Significance

13. SUMMARY EVALUATION OF SIGNIFICANCE **Will the proposed action, considered as a whole:**	**IMPACT Unknown**	**None**	**Minor**	**Potentially Significant**	**Can Impact Be Mitigated**	**Comment Index**
a. Have impacts that are individually limited, but cumulatively considerable? (A project or program may result in impacts on two or more separate resources which create a significant effect when considered together or in total.)		X				
b. Involve potential risks or adverse effects which are uncertain but extremely hazardous if they were to occur?		X				
c. Potentially conflict with the substantive requirements of any local, state, or federal law, regulation, standard or formal plan?		X				
d. Establish a precedent or likelihood that future actions with significant environmental impacts will be proposed?		X				
e. Generate substantial debate or controversy about the nature of the impacts that would be created?	X				yes	13a
f. Is the project expected to have organized opposition or generate substantial public controversy? (Also see 13a)	X					13b
g. List any federal or state permits required.						13c

Comments 13a and b

The use of pesticides can generate controversy from some people. Public outreach and information programs can educate the public on the use of pesticides. It is not known if this project would have organized opposition. The landowner has consented to the proposed project if FWP schedules the treatment around the ranch's cattle operations located at the project location (cattle present from May 1- October 1 (or later)) and no project activities when road conditions are wet.

Comment 13c

The following permit would be required:

- MDEQ Pesticide General Permit

4 ALTERNATIVES

4.1 *Alternatives Evaluated*

4.1.1 Alternative 1 – No Action

The no action alternative would allow status quo management to continue which would maintain the present goldfish population to reproduce and entrain downstream.

This alternative would allow the existing goldfish population to grow and expand downstream, which could potentially impact native prairie fish populations and public fisheries (i.e. Fort Peck Reservoir).

4.1.2 Alternative 2 – Proposed Action

The proposed action involves removing goldfish from an unnamed pond near Zortman and its inlet springs using Prenfish and Prentox rotenone.

This alternative offers the highest probability of achieving the goals of removing an invasive population of goldfish and conserving native prairie fish populations at downstream locations.

4.1.3 Alternative 3 – Mechanical Removal

This alternative would involve using gill nets and/or trap nets to remove the goldfish.

This alternative was attempted in October 2016 utilizing pumps to draw down the pond and manually removing the goldfish with nets. This action was unsuccessful in removing all the goldfish and the population had fully recovered by 2019.

5 Public Comments Instructions

The comment period is 33 days. Comments must be received by 5:00 pm on July 10, 2020.

Submit written comments to: Montana Fish, Wildlife & Parks

c/o _Goldfish Treatment EA comments

Attn: Cody Nagel

2165 Hwy 2 East

Havre, MT 59501

cnagel@mt.gov

406-265-6177 x226

Comment period is __32____ days. Comments must be received by ___July 17, 2020_________

Prepared by: Cody Nagel Date: 6/1/2020

6 LITERATURE CITED

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